Sanftleben et al. disclose conformal coating materials for forming a protective conformal coating on the surface of an electronic assembly, e.g., a filled printed circuit board. The conformal coating materials of Sanftleben et al. include hot melt compositions that are either nonreactive, i.e., can be remelted after solidifying, or reactive, i.e., curable.

Boger et al. disclose that five principal methods have been used to apply coatings of moisture proof insulators to printed circuit boards, and that these methods include immersion, brush-coating, roller, spray and slit die. The portion of Boger et al. that discusses the slit die coating method at column 2, lines 14-17 and lines 52-63, which forms the basis of the rejection, is herein referred to as the "slit die method."

Claim 10 is directed to a method of forming a continuous film layer of a thermoplastic composition onto a substrate. The method includes providing a molten thermoplastic composition, advancing a substrate along a path, dispensing a continuous film of the thermoplastic composition from a coating device at a coating temperature where the thermoplastic composition has a complex viscosity of less than about 500 poise at about 1000 radians/seconds at the coating temperature and a complex viscosity ranging from about 100 poise to about 1,000 poise at about 1 radian/second at the coating temperature, suspending the film between the coating device and the substrate, and contacting the film with the advancing substrate. The thermoplastic composition is released form the coating device at a temperature of less than about 160°C. Sanftleben et al. do not teach a thermoplastic composition that has a complex viscosity of less than about 500 poise at about 1000 radians/seconds at the coating temperature and a complex viscosity ranging from about 100 poise to about 1,000 poise at about 1 radian/second at the coating temperature. Instead, Sanftleben et al. disclose that their compositions preferably have a viscosity of less than about 10 poise at a dispensing temperature in the range of about 40°C to 250°C, and that a viscosity of less than about 2.5 poise is preferred. Sanftleben et al. do not teach the rate at which the viscosity is measured. Sanftleben et al. also do not provide any information as to the viscosity of their Example compositions at elevated temperatures. Sanftleben et al. thus fail to teach the thermoplastic composition recited in claim 10.

Boger et al. do not teach or suggest anything about compositions used in the slit die method. Thus, the proposed combination of Sanftleben et al. and Boger et al. lacks a required element of claim 10, i.e., the thermoplastic composition recited therein. For this reason alone, Applicants submit that the rejection of claim 10 under 35 U.S.C. § 103 over Sanftleben et al. in view of Boger et al. is unwarranted and respectfully request that it be withdrawn.

The rejection is further deficient for at least the following reasons. Sanftleben et al. fail to teach dispensing a continuous film of thermoplastic composition from a coating device and suspending the film between the coating device and the substrate. Sanftleben et al. disclose a number of possible methods for applying hot melt conformal coating compositions including nonpattern-specific spray, extrusion, brushing and flowing heated wave techniques. Sanftleben et al. state, "[I]t would be desirable if such a coating material could be applied using techniques which enable more selective application in order to avoid bridging the gap between the circuit components and the circuit board of the electronic assembly" (Sanftleben et al., col. 3, lines 13-17). In the Examples, Sanftleben et al. describe applying a composition using a handheld cartridge applicator. In contrast to the assertions in the Office action, Sanftleben et al. do not teach or suggest that this application involved dispensing a continuous film from a coating device or that a film was suspended between the coating device and a substrate. Instead, Sanftleben et al. disclose, "Minimal stringing occurred between the applicator and the circuit board being coated during application, <u>suggesting that the formulation could be dispensed with a brush applicator</u>" ((Emphasis added) col. 10, lines 26-27). The presence of stringing indicates that the composition of Sanftleben et al. did not form a continuous film. In addition, Sanftleben et al. specifically suggest that the composition could be dispensed with a brush applicator. Thus, the skilled artisan would understand Sanftleben et al. as directing the use of a brush applicator --not a slit die. It is also noteworthy that the remaining examples of Sanftleben et al. use spray nozzle application techniques. Accordingly, the skilled artisan would not think to apply the composition of Sanftleben et al. using method that includes dispensing a continuous film from a coating device and then suspending the film between the coating device and a substrate.

Boger et al., like Sanftleben et al., describe a number of coating methods that have been used in the past to apply coatings of moisture proof insulators to printed circuit boards including immersion, brush-coating, roller, spray and slit die. Nothing in Boger et al. directs the skilled artisan to select the slit die method from among the many methods identified in Boger et al. for use with the Sanftleben et al. composition. To the contrary, Boger et al. actually teach away from using the slit die method. Boger et al. teach that there are many drawbacks associated with the disclosed coating methods in general, and the slit die coating method in particular. To further illustrate the drawbacks of the cited coating methods, Boger et al. incorporate U.S. Patent Nos. 4,880,663 and 4,735,819 by reference. Both the '663 patent and the '819 patent disclose:

> [A]ll methods except brush-coating require masking for those parts to be left uncoated. The Masking operations, that is, mounting and removal of the masks, must be done manually, causing a bottleneck in the mass production process.

('663 patent, col., 2, lines 48-57; '819 patent, col. 2, lines 55-60). Boger et al. then disclose the benefits of their own coating method. Although Boger et al. mention some of the advantages of the prior art coating methods, the clear teaching of the reference, taken as a whole, is away from the prior art methods including the slit die method. Thus, the skilled artisan would have no reason to select the slit die method from among the many coating methods disclosed in both Boger et al and Sanftleben et al., and further would likely refrain from doing so in light of Boger et al.'s express teaching away from such a method and Sanftleben et al.'s direction to use a brush coating method.

Boger et al. are further deficient in that they fail to teach anything about the properties of the compositions (i.e., the properties of the compositions prior to coating, not after coating) that can be used in the slit die method referred to therein. Without this information, the skilled artisan can have no reasonable expectation of successfully coating the composition of Sanftleben et al. using the Boger et al. slit die method. The Office action implies that commercially available conformal coating compositions can be coated using a slit die method. Neither Sanftleben et al. nor Boger et al. teach or suggest that all commercially available conformal coating compositions can be coated using the slit die method. Sanftleben et al., in particular, do not teach that all of their compositions can be coated using a slit die method. Instead, Sanftleben et al. indicate that the

properties of a composition impact the coating methods that are available for use with the composition. This is demonstrated by the previously quoted passage from Sanftleben et al. regarding stringing and application using a brush applicator. The previously quoted Sanftleben et al. passage demonstrates that all conformal coating compositions are not necessarily capable of being applied using all known coating methods.

Sanftleben et al. also disclose that a wide variety of conformal coating compositions exist including "polymeric materials of the silicone, acrylic, urethane and epoxy families" (Sanftleben et al., col. 1, lines 36-38). Sanftleben et al. further disclose two additional classes of conformal coating compositions, i.e., reactive and nonreactive. Some of the coating compositions of Sanftleben et al. exhibit viscosities on the order of 50,000 cps to 5,000,000 cps at room temperature; others are liquid at room temperature. Thus, conformal coating compositions can have wide ranging properties and compositions. Accordingly, there is no basis for assuming that all conformal coating compositions can be coated using a slit die method. Therefore, it has not been established that the skilled artisan would have a reasonable expectation of successfully coating the composition of Sanftleben et al. using a slit die method. In light of the above, Applicants submit that the rejection of claim 10 under 35 U.S.C. § 103 over Sanftleben et al. in view of Boger et al. is unwarranted and respectfully request that it be withdrawn.

Applicants further submit that claims 3-6, 8, 11-12, 33, 35, 36, 39-42, 44, and 46-48, are patentable under 35 U.S.C. § 103 over Sanftleben et al. in view of Boger et al. for at least the same reasons set forth above in distinguishing claim 10.

Claims 2-12, 33-36, 38-42, 44, and 46-56 stand rejected under 35 U.S.C. § 103 over EP 315,013 in view of Maletsky et al. (U.S. 4,939,202) further in view of Smith et al. (U.S. 3,402,086) and optionally further in view of Buell (U.S. 4,147,580).

EP 315,013 discloses a method of making a diaper that includes coating a thermoplastic polymer material onto a web by means of a surface nozzle or an application roller.

Maletsky et al. disclose hot melt compositions. The one example composition disclosed by Maletsky et al. is a hot melt adhesive blend that includes hydrocarbon resin, amorphous polypropylene, antioxidant and crystalline polypropylene, and has a melt viscosity of 11,000 cps at 325°F (i.e., 162.8°C).

Smith et al. disclose a hot melt extrusion coating process that includes extruding a random copolymer of ethylene and acrylic acid at a temperature of about 105°C to about 250°C in the form of a thin film that is deposited on a substrate.

Buell et al. disclose a method of bonding a porous web to a substrate. The Buell et al. method includes applying a discontinuous hot melt adhesive to a porous fibrous web by direct contact extrusion.

As stated above, claim 10 is directed to a method that includes dispensing a continuous film of thermoplastic composition from a coating device at a coating temperature where the thermoplastic composition has a complex viscosity of less than about 500 poise at about 1000 radians/seconds at the coating temperature and a complex viscosity ranging from about 100 poise to about 1,000 poise at about 1 radian/second at the coating temperature, and suspending the film between the coating device and a substrate. EP 315,013 discloses a nonwoven coated with a "thermoplastic high-polymer material, namely ... polyethylene, EVA or ATP" (EP 315,013 page 5). EP 315,013 provides no information regarding the complex viscosity of the "thermoplastic high-polymer material." Thus, EP 315,013 does not teach or suggest a thermoplastic composition having a complex viscosity of less than about 500 poise at about 1000 radians/seconds at the coating temperature and a complex viscosity ranging from about 100 poise to about 1,000 poise at about 1 radian/second at the coating temperature. EP 315,013 also does not teach suspending a film between a coating device and a substrate. Instead, EP 315,013 discloses coating a nonwoven web using an application roller or a surface nozzle. EP 315,013 provides no details regarding the how the application roller or the surface nozzle applies the thermoplastic material. Thus, EP 315,013 fails to teach the method of claim 10.

It is undisputed that Maletsky et al. fail to teach or suggest suspending a film between a coating device and a substrate.

Smith et al. fail to cure the deficiencies of EP 315,013 and Maletsky et al. Smith et al. do not teach coating a thermoplastic composition having a complex viscosity of less than about 500 poise at about 1000 radians/seconds at the coating temperature and a complex viscosity ranging from about 100 poise to about 1,000 poise at about 1 radian/second at the coating temperature. Instead, Smith et al. disclose coating specific

random copolymers of ethylene and acrylic acid that they specifically developed for use in the noncontact coating method described therein. Smith et al. also disclose that olefin polymers and copolymers have been coated using a method referred to as "hot melt extrusion process," which is described as including extruding molten polymer through a slit die to form a molten film of polymer and depositing the molten film onto a substrate.

All thermoplastic polymers and thermoplastic compositions do not inherently exhibit the same properties. Properties such as viscosity, melt index, and cohesive strength can vary greatly from one thermoplastic polymer to another and from one thermoplastic composition to another. Smith et al. do not teach or suggest that all thermoplastic polymers, regardless of their properties, can be coated using the noncontact coating method described therein. To the contrary, Smith et al. specifically note the shortcomings that arise when the hot melt extrusion process described therein is used to coat polyolefin polymers and copolymers. Smith et al. address these problems by formulating a specific copolymer to overcome these shortcomings. Thus, Smith et al. teach that the noncontact coating method described therein is not universally suited to coating all olefin polymers and copolymers. Therefore, it has not been established that the noncontact coating method of Smith et al. is suitable for use in applying all thermoplastic polymers and thermoplastic compositions. Accordingly, there can be no reasonable expectation that the composition of Maletsky et al. can be coated using a noncontact coating method of Smith et al.

The Example composition disclosed by Maletsky et al. is described as an adhesive blend that includes hydrocarbon resin, amorphous polypropylene, antioxidant and crystalline polypropylene, and has a melt viscosity of 11,000 cps at 162.8°C. There is nothing in Maletsky et al. or Smith et al. that teaches or suggests that the properties of the copolymer of Smith et al. are anything like the properties of the adhesive blend of Maletsky et al. Moreover, there is nothing in Smith et al. to suggest that a coating method that is suitable for the neat copolymers of Smith et al. is suitable for the hot melt adhesive blend of Maletsky et al. Accordingly, the skilled artisan, familiar with the adhesive blend of Maletsky et al., would have no reason to look to the coating method disclosed in Smith et al., and further would have no reasonable expectation that the

adhesive blend of Maletsky et al. could be successfully coated using the method of Smith et al.

Moreover, neither the specifically developed ethylene/acrylic acid copolymers of Smith et al., nor olefin polymers and copolymers in general, inherently exhibit a complex viscosity of less than about 500 poise at about 1000 radians/seconds at the coating temperature and a complex viscosity ranging from about 100 poise to about 1,000 poise at about 1 radian/second at the coating temperature. Accordingly, the skilled artisan would have no reasonable expectation of successfully dispensing a continuous film of a thermoplastic composition having a complex viscosity of less than about 500 poise at about 1000 radians/seconds at the coating temperature and a complex viscosity ranging from about 100 poise to about 1,000 poise at about 1 radian/second at from a coating device and suspending the continuous film between the coating device and a substrate using the method described in Smith et al.

In light of the above, Applicants submit that the proposed combination of EP 315,013, in view of Maletsky et al. and Smith et al. fails to teach or suggest the method of claim 10.

Applicants note that the statements in the Office action seem to indicate that the rejection has been expanded to cover all of the polymers disclosed in EP 315,103 and Maletsky et al. However, it has not been established that the polymers of EP 315,103 and Maletsky et al. exhibit a complex viscosity of less than about 500 poise at about 1000 radians/seconds at the coating temperature and a complex viscosity ranging from about 100 poise to about 1,000 poise at about 1 radian/second at the coating temperature. If the rejection is maintained on this basis, Applicants respectfully request the Examiner to provide support for the proposition that the polymers of EP 315,103 and Maletsky et al. inherently exhibit a complex viscosity of less than about 500 poise at about 1000 radians/seconds at the coating temperature and a complex viscosity ranging from about 100 poise to about 1,000 poise at about 1 radian/second at the coating temperature.

We now turn to the portion of the rejection that is based on Buell. Applicants fail to understand the relevance of Buell. It is undisputed that Buell does not teach a noncontact coating method. Even so, the Office action takes the position that Buell "suggests" a noncontact coating method. In particular, the Office action states, "The

reference to Buell ... suggested that if the extruder die [of Maletsky et al. or EP 315,013] was in contact with the nonwoven one skilled in the art would have attained a discontinuous coating" (June 12, 2002 Office action, page 8, lines 5-7). Applicants understand the above-quoted passage to mean that the Office action is of the position that Buell teaches that all contact coating methods inherently produce a discontinuous coating. This simply is not true. Buell does not teach that all contact coating methods inherently create discontinuous coatings. The method of Buell is not designed to obtain a continuous coating, i.e., the object of Buell is not to obtain a continuous coating. Rather, Buell discloses applying discreet "globules" of hot melt adhesive to a nonwoven web. Applying discreet globules is part of the Buell method, and the presence of discreet globules on the nonwoven web is an intended outcome of the Buell coating process. Thus, the skilled artisan seeking to obtain a continuous coating would have no reason to look to Buell, and further would find Buell to have no bearing on EP 315,013, Maletsky et al., or Smith et al. In light of the above, Applicants submit that the rejection of claim 10 under 35 U.S.C. § 103 over EP 315,013 in view of Maletsky et al. further in view of Smith et al. and optionally in view of Buell is unwarranted and request that it be withdrawn.

Claims 2-9, 11-12, 33-36, 38-42, 44, and 46-56 are patentable under 35 U.S.C. § 103 over EP 315,013 in view of Maletsky et al., further in view of Smith et al., and optionally further in view of Buell for at least the same reasons set forth above in distinguishing claim 10.

Claims 3 and 4 stand rejected under 35 U.S.C. § 103 over EP 315,013 in view of Maletsky et al. further in view of Smith et al. optionally in view of Buell and further in view of Waggoner (U.S. 3,904,806) or U.K. 688,637.

Waggoner discloses composite films of glassine-polyolefin copolymers resins.

UK 688,637 discloses a process of applying a film of a synthetic polymer.

Claims 3 and 4 are dependent upon claim 10 and Applicants position as set forth above with respect to claim 10 is hereby incorporated herein by reference. Neither Waggoner nor U.K. 688,637 cure the above-described deficiencies of EP 315,013, Maletsky et al., Miller et al., Smith et al., Thomson et al. and Buell. Accordingly, Applicants submit that claims 3 and 4 are patentable over the cited references for at least

the same reasons set forth above in distinguishing claim 10. Claim 3 is further distinguishable over the cited references for at least the following reasons. Claim 3 discloses that the coating device is spaced from the path of the substrate a distance between about 0.5 and 10 mm. Waggoner does not teach or suggest a coating device spaced from the path of the substrate a distance between about 0.5 and 10 mm. Instead, Waggoner discloses that adhesion is achieved by adjusting the "length of the air gap between the lip of the die and the nip." Waggoner does not teach or suggest what this length should be. Likewise, UK 688,637 does not teach or suggest a coating device spaced from the path of the substrate a distance between about 0.5 and 10 mm. Instead UK 688,637 discloses that the distance is "extremely short." UK 688,637 provides no information as to what is meant by this phrase. The proposed combination of EP 315,013 in view of Maletsky et al., further in view of Smith et al. and further view of Waggoner or UK 688,637 thus lacks a required element of claim 3. Applicants submit, therefore, that the rejection of claim 3 under 35 U.S.C. § 103 over EP 315,013, in view of Maletsky et al., in view of Smith et al., optionally in view of Buell, and further in view of Waggoner or UK 688,637 is unwarranted and request that it be withdrawn.

Claim 4 is dependent upon claim 3 and is patentable over the proposed combination of references for at least the same reasons set forth above in distinguishing claim 3.

Claim 55 stands rejected under the judicially created doctrine of obviousness-type double patenting over claim 18 of U.S. Patent No. 5,827,252 (the '252 patent) in view of EP 315,013.

Claim 55 is directed to a method of forming a continuous film layer that includes suspending the film such that the film builds in viscosity and cohesive strength such that any fibers of the nonwoven substrate do not penetrate the continuous film. Claim 18 of the '252 patent does not recite, "suspending a continuous film such that the film builds in viscosity and cohesive strength such that any fibers of a nonwoven substrate do not penetrate the continuous film." The Examiner does not dispute that EP 315,013 fails teach or suggest suspending a continuous film such that it builds in viscosity and cohesive strength such that any fibers of a nonwoven substrate do not penetrate the continuous film. Thus, the proposed combination of claim 18 of the '252 patent in view

of EP 315,013 lacks a required element of claim 55. It appears that the Office action now relies on a theory of inherency in support of the rejection (see June 12, 2002 Office action, page 11, lines 12-16). Inherency is not a proper basis for an obviousness rejection. See In re Spormann, 363 F.2d 444, 448, 150 USPQ 449, 452 (CCPA 1966) ("That which is inherent is not necessarily known. Obviousness cannot be predicated on that which is unknown."). Accordingly, Applicants submit that the rejection of claim 55 under the judicially created doctrine of obviousness-type double patenting over claim 18 of the '252 patent in view of EP 315,013 is unwarranted and request that it be withdrawn.

The claims now pending in the application are in condition for allowance and such action is respectfully requested. The Examiner is invited to telephone the undersigned if a teleconference interview would facilitate prosecution of this application.

Please charge any additional fees or credit any overpayment to Deposit Account No. 06-2241.

Respectfully submitted,

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TAB 1

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TAB 2